

Improving Genetic Testing for Breast Cancer Susceptibility in Primary Care: Are Computers the Answer?

Green MJ, Peterson SK, Baker M, et al. Effects of a computer-based decision aid on knowledge, perceptions, and intentions about genetic testing for breast cancer susceptibility: a randomized controlled trial. JAMA 2004;292:442-52.

Study Overview

Objective. To determine the effectiveness of a computer-based decision aid for educating women about BRCA1 and BRCA2 genetic testing.

Design. Randomized controlled trial.

Setting and participants. Outpatient clinics offering genetic counseling at 6 U.S. medical centers enrolled women who were 18 years or older; able to speak, read, and write English; and referred for genetic counseling for evaluation of either a personal or family history of breast cancer. Women were excluded if they previously underwent genetic counseling or testing for breast cancer susceptibility.

Intervention. The study intervention included an interactive, computer-based educational program about breast cancer risk and genetic testing, followed by standard genetic counseling. The control group received standard genetic counseling along with cancer education and risk assessment.

Main outcome measures. Participants' knowledge, risk perception, intention to undergo genetic testing, decisional conflict, satisfaction with decision, anxiety, and satisfaction with the intervention. Participants were stratified into risk groups: those at low risk of carrying a BRCA1/2 mutation (< 10% based on BRCAPRO model) and those at high risk (\geq 10%). Knowledge about breast cancer and genetic testing was measured using a 20-item multiple choice and true/false questionnaire modified from an existing research instrument. Perceived risk was assessed using a 3-item survey derived from previously published instruments. Intention to undergo genetic testing was determined using a single 6-point Likert scale, while decisional conflict was determined using a previously validated instrument. Anxiety was measured using the Spielberger State-Trait Anxiety Inventory. Outcomes assessments were made at baseline and after genetic counseling in the control group and at baseline, after computer use, and after counseling for the intervention group. Both groups were contacted at 1 and 6 months to assess testing decisions.

Main results. Of 432 eligible participants, 211 (48.8%) were enrolled. At baseline, no statistical differences were seen between the 2 groups. Knowledge scores increased significantly from baseline in both groups regardless of the participants' risk of carrying a BRCA1/2 mutation. For women at low risk, the increase in knowledge score was significantly greater in the intervention group compared with the control group ($P = 0.3$). There were no significant differences in knowledge scores between the intervention and control groups in high-risk women. There was a significant decrease in the participants' perceptions of their absolute risk of developing breast cancer in both groups, regardless of participant risk status. Low-risk women randomized to the control group had the greatest decrease in risk perception scores. For low-risk women, the percentage of women who indicated that they "very likely" or "definitely" had a BRCA1/2 mutation decreased significantly in the control group ($P < 0.001$). This decrease was not significant for low-risk women after computer use or high-risk women in either study arm. There was a significant decrease in the number of low-risk women intending to be tested in both the intervention and control arm, with the greatest decrease observed for women in the control group. There were no significant changes in intent to be tested in high-risk women. Anxiety scores decreased significantly for both low- and high-risk women in the control group, and there were no significant changes in anxiety scores for women allocated to the intervention arm. Satisfaction scores were very high at both baseline and follow-up in both groups.

Conclusion. A computer-based decision aid was more effective at increasing breast cancer and genetic testing knowledge scores for low-risk women than genetic counseling; however, genetic counseling was more effective at reducing anxiety and helping women make more accurate predictions regarding their risk of carrying a deleterious BRCA1/2 mutation.

Commentary

The increasing pace of cancer genetic discovery, improved awareness of hereditary cancer syndromes, and direct-to-consumer advertising of genetic testing [1] are increasing

demand for genetic services. The group of providers most likely to face this increased patient demand will be primary care physicians [2]. However, primary care physicians have indicated concerns with their ability to adequately integrate genetic services into their practices [3,4]. Computerized decision aids could potentially address providers' knowledge deficits and assist patients and providers. Green et al's study is unique in its evaluation of a tool directed at patient knowledge and behaviors.

The study by Green et al demonstrated that patient knowledge scores increased and risk perceptions decreased in low-risk women who used the computer program. This is a positive finding, as most inappropriate referrals to genetic counselors involve women who mistakenly overestimate their actual breast cancer risk. Not surprisingly, the computer program did little to impact anxiety related to breast cancer when compared with the genetic counselor. Genetic counselors have long focused on addressing the psychosocial factors attached to genetic testing, and it is unlikely that these skills could be immediately translated into a computer-based tool.

Applications for Clinical Practice

An interactive, computer-based decision aid is effective at

increasing knowledge regarding breast cancer and genetic testing and decreasing intent to undergo testing for women at low risk of carrying a BRCA1/2 mutation. The program represents an important potential method for integrating genetic services into primary care and would complement educational interventions and computer-based decision support aimed at providers.

—Review by Harvey J. Murff, MD, MPH

References

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